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I, the undersigned, being an officer duly authorised in accordance with Section 74(1) and (4) of the Deregulation & Contracting Out Act 1994, to sign and issue certificates on behalf of the Comptroller-General, hereby certify that annexed hereto is a true copy of the documents as originally filed in connection with the patent application identified therein.

In accordance with the Patents (Companies Re-registration) Rules 1982, if a company named in this certificate and any accompanying documents has re-registered under the Companies Act 1980 with the same name as that with which it was registered immediately before re-registration save for the substitution as, or inclusion as, the last part of the name of the words "public limited company" or their equivalents in Welsh, references to the name of the company in this certificate and any accompanying documents shall be treated as references to the name with which it is so re-registered.

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Signed Stephen Hordley

Dated 11 November 2003

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GB 0225133.8

By virtue of a direction given under Section 30 of the Patents Act 1977, the application is proceeding in the name of

PORVAIR FILTRATION GROUP LIMITED,
Clywedog Road South,
WREXHAM,
LL13 9X3,
United Kingdom

Incorporated in the United Kingdom,

[ADP No. 08666539002]

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THE PATENT OFFICE
A
29 OCT 2002
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Patents Act 1977
(Rule 16)

The Patent Office

Request for grant of a patent

(See the notes on the back of this form. You can also get an explanatory leaflet from the Patent Office to help you fill in this form)

The Patent Office
Cardiff Road
Newport
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NP10 8QQ

1. Your reference — P015879GB AP FAG
290CT02 E759388-2 D02246
P01/7700 0.00-0225133.8

2. Patent application number *(The Patent Office will fill in this part)* — 0225133.8
29 OCT 2002

3. Full name, address and postcode of the or of each applicant *(underline all surnames)* — PORVAIR TECHNOLOGY LIMITED
Clywedog Road South
Wrexham
LL13 9X3

Patents ADP number *(if you know it)* 7997071001

If the applicant is a corporate body, give the country/state of its incorporation — United Kingdom

4. Title of the invention — Porous Polyethylene for Solid Phase Extraction, Separation and Synthesis

5. Name of your agent *(if you have one)* — D Young & Co

"Address for service" in the United Kingdom to which all correspondence should be sent *(including the postcode)* — 21 New Fetter Lane
London
EC4A 1DA

Patents ADP number *(if you know it)* — 59006

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and *(if you know it)* the or each application number	Country	Priority application number *(if you know it)*	Date of filing *(day / month / year)*

7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application	Number of earlier application	Date of filing *(day / month / year)*

8. Is a statement of inventorship and of right to grant of a patent required in support of this request? *(Answer 'Yes' if:*
a) any applicant named in part 3 is not an inventor, or
b) there is an inventor who is not named as an applicant, or
c) any named applicant is a corporate body.
See note (d)) — Yes

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9. Enter the number of sheets for any of the following items you are filing with this form. Do not count copies of the same document

Continuation sheets of this form	0
Description	2
Claim(s)	0
Abstract	0
Drawing(s)	0

10. If you are also filing any of the following, state how many against each item.

Priority documents	0
Translations of priority documents	0
Statement of inventorship and right to grant of a patent *(Patents Form 7/77)*	0
Request for preliminary examination and search *(Patents Form 9/77)*	0
Request for substantive examination *(Patents Form 10/77)*	0
Any other documents *(please specify)*	0

11. I/We request the grant of a patent on the basis of this application.

Signature D. Young & Co. Date 29 October 2002

D Young & Co (Agents for the Applicants)

12. Name and daytime telephone number of person to contact in the United Kingdom — A J M Pilch — 023 8071 9500

Warning

After an application for a patent has been filed, the Comptroller of the Patent Office will consider whether publication or communication of the invention should be prohibited or restricted under Section 22 of the Patents Act 1977. You will be informed if it is necessary to prohibit or restrict your invention in this way. Furthermore, if you live in the United Kingdom, Section 23 of the Patents Act 1977 stops you from applying for a patent abroad without first getting written permission from the Patent Office unless an application has been filed at least 6 weeks beforehand in the United Kingdom for a patent for the same invention and either no direction prohibiting publication or communication has been given, or any such direction has been revoked.

Notes

a) *If you need help to fill in this form or you have any questions, please contact the Patent Office on 08459 500505.*

b) *Write your answers in capital letters using black ink or you may type them.*

c) *If there is not enough space for all the relevant details on any part of this form, please continue on a separate sheet of paper and write "see continuation sheet" in the relevant part(s). Any continuation sheet should be attached to this form.*

d) *If you have answered 'Yes' Patents Form 7/77 will need to be filed.*

e) *Once you have filled in the form you must remember to sign and date it.*

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Porous Polyethylene for Solid Phase Extraction, Separation and Synthesis

Background

The separation techniques of solid phase extraction and chromatography have utilised the materials silica and polystyrene in specially prepared forms as adsorbent media. In more recent years drug discovery programmes have required rapid synthesis of biologically active organic molecules. Combinatorial chemistry is one approach for producing libraries of such molecules and solid phase synthesis is one of the preferred techniques used. In all these applications the loose powder used can create problems with device assembly, performance and ease of use.

The separation applications utilise cartridges and well plates, the loose powder can perform poorly if liquids either block the cartridge or develop flow channels through the powder. Device assembly has its own problems where an exact dose of the powder must be contained between two porous frits within the cartridge or well plate. Companies such as 3M and Merck have developed methods of immobilising the powder on inert substrates to alleviate this problem.

The problems for solid phase synthesis are different, chemists need to make large numbers of different molecules for drug screening programmes. Weighing out these powders and then filtering them from the reactants or solvents can be time consuming when large numbers of separate reactions are being carried out. Companies such as Irori and Millennium Pharmaceuticals have partly solved this by containing the powders in specialised packages but they have their own limitations in terms of poor reproducibility or low chemical activity. The latter encapsulates the sorbent media in porous polyethylene plugs. The approach discussed here removes the need to encapsulate the adsorbent media by taking the moulded porous polyethylene plug and activated the internal surface so it becomes the adsorbent media itself.

Description

Polyethylene powder can be moulded into porous plugs and other more complex shapes by a sintering process. The size, shape and choice of polyethylene powder can significantly influence the nature of the porosity within the plug and its internal surface area. The porous plug can therefore be tailored to make it suitable as a platform upon which other chemical species can be attached to render the surface active for the applications described above. The

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chemical species can be attached by several methods but the preferred method is plasma polymerisation, which penetrates the entire porous structure quickly and uses minimal raw materials and energy to do so. Similar techniques can also be used to further build on the existing internal surface area where this is not considered sufficient to provide the chemical activity required. Other patents exist that cover the concept of grafting polyethylene for peptide synthesis and assays but they do not use porous polyethylene as the platform or plasma polymerisation as the grafting technique. This step significantly increases the number of sites available, which increases the chemical activity possible within the device and additionally produces a device in a convenient package with an acutely known level of activity.

Prior Art

US 5,886,104, US 6,369,168, US 5,618,887

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